DIVIDEND LEVEL AND VARIABILITY EFFECTS ON STOCK RETURNS

BY

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THIS DISSERTATION IS DEDICATED TO

MY WIFE CATHY

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Abstract of Dissertation Presented to the Graduate Council of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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An investor's monetary return from ownership of common stock can come as cash dividends, as capital gains, or as a combination of both forms. If investors prefer one form of return over the other, a firm must take account of this in its financing decisions if it is to maximize the value of its stockholder's equity. If investors are indifferent, then a firm need not consider investors preferences for either form in setting dividend policy.

Theoretical studies have been published arguing for indifference, an aversion for, and a preference for dividends versus capital gains. Various empirical studies have supported each of the positions in turn. This dissertation,

using a more sophisticated methodology to reduce or avoid statistical problems in past studies, attempts to determine whether dividend level affects required returns on stocks. The test period spanned 19 years, from 1958 to 1976. The data were taken from the CRSP tapes and the COMPUSTAT tapes. The sample of firms grew from 245 firms in 1958 to 508 firms in 1976. Two recent studies by Black and Scholes and Bar-Yosef and Kolodny used similar models but came to opposite conclusions concerning dividend relevancy. Their methodologies are compared and their models retested using a common methodology to reconcile their results. The comparison test results support the conclusion that dividends do not affect stock returns. Several additional tests are run to determine if there is a significant but varying dividend effect over time. Results from serial correlations and time-series regressions against proxies for investors' savings or consumption preferences do not support the contention that there is a varying effect over time.

It is also possible that, although no dividend level effect exists because of an equilibrium "clientele" effect, there may exist an aversion for dividend level variability. Investors with different preferences may gravitate to firms which satisfy their preferences. These investors would not want their chosen firms to vary from that preferred policy. A dividend variability measure is added to the models used in the dividend level tests and the tests for a static and

a changing effect used above are repeated. Results of the variability effect tests do not support the hypothesis that there exists an aversion for dividend variability among investors.

CHAPTER 1
INTRODUCTION

Background of the Study

An investor's monetary return from ownership of common stock can come in two forms: (1) cash dividends or (2) capital gains. If investors are indifferent between dividends and capital gains, then a firm, in setting its dividend policy, need not be concerned over investor preferences for dividends versus capital gains. If, however, investors prefer one form of return over the other, then the firm must take account of this in its financing decisions if it is to maximize the value of its stockholders' equity.

There are two major opposing views on the importance of dividends versus capital gains. One argument is that in a perfect market, but with uncertainty present, investors are indifferent between receiving a dollar of dividends or having that dollar retained and reinvested, and thus providing an expected capital gain of one dollar, which is equal to the increase in the present value of the future earning stream. The other argument posits that investors view future earnings with increasing uncertainty for each period further in the future, causing a dividend preference (i.e., "A bird in the hand is worth two in the bush").

The proponents of both points of view recognize the presence of market imperfections (taxes, transaction costs, etc.). Under the indifference hypothesis, the argument is made that these imperfections may cause investors with similar characteristics to gravitate toward those corporations whose payout policies are best for this particular set of investors. In other words, investors in high tax brackets, and who do not need current cash income, will tend to invest in companies which have a low payout ratio. Conversely, investors such as retirees, who are in low tax brackets and who do need cash income, will seek high payout companies. In any event, once equilibrium has been established, and a firm's "clientele" has been set, then its present policy, whatever that policy happens to be, will be its optimal policy. Further, because of transaction costs, any change in dividend policy will decrease the value of the firm's shares, barring a major change in its circumstances. Proponents of the dividend preference hypothesis, on the other hand, believe that dividend policy has a much more direct and important effect on the firm's value. Many empirical tests have been run in an attempt to resolve the preference controversy, but taking the tests as a whole, the results have been inconclusive. However, the tests themselves may contain statistical errors or other problems, and if these problems are overcome, it may be

possible to reach a conclusion as to how the level of the dividend payout policy affects a firm's value.

In addition to the question of how the dividend payment level affects value, there is also the question of what effect, if any, the stability of the dividend payment policy has on share value. This second issue has not received much attention in the empirical literature, but it is clear that corporate decision-makers, by and large, assume that such variability reduces the market value of the dividend stream. Accordingly, most firms have tried to maintain a stable, predictable dividend.[1] There are several ways of looking at dividend stability and at what constitutes a "stable, predictable dividend." We can focus on the cash dividend, on dividends as a percent of earnings (the payout ratio), or on dividend yield. With fluctuating earnings, a firm cannot stabilize all three. Further, dividend yield also depends on the price of the stock, so it is even less controllable than cash dividends and the payout rate. The question is which, if any, of these variables a firm should try to stabilize. Many firms attempt to stabilize the cash dividend, or, if earnings are growing, they attempt to stabilize the dividend growth rate, generally at a rate

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[1]For a survey of decision maker opinions and empirical tests of firms' behaviors, see Lintner (1953 and 1956). For general discussion of reasoning and firm action, see Brigham (1977) and Van Horne (1977).

about equal to the long-run growth rate in earnings. No increase in the dividend will, however, be instituted unless management is sure that earnings will support the higher level, that is, the dividend is cautiously increased in line with earnings, but the dividend is not changed with earnings unless management believes the earnings change is permanent.[2] This occurs because managements are extremely anxious to avoid ever being forced to reduce the dividend. From an operational standpoint, corporations can follow several basic policies, as follows:

1. Dollar dividends can be made to follow a trend line that approximates the expected long-run growth in earnings.

2. The dollar dividend can be set equal to a fixed percentage of expected or normalized earnings, that is, the firm has a stable target dividend payout ratio. It should be noted that this policy is equivalent to (1).[3]

3. The firm could follow a policy of paying out a fixed percentage of earnings each year. If earnings vary, then this policy would lead to varying dollar dividends.

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[2]See Lintner (1956).

[3]We disregard the possibility that a firm may also "manage" its earnings through accounting policy changes. It is possible - indeed likely - that some firms do try to maintain a stable earnings and dividend growth rate, stabilizing reported earnings by periodic accounting changes. This would lead to a more stable payout ratio than would be true if the dividend growth rate only were stabilized.

4. The firm could attempt to stabilize its dividend yield, or, more logically, the dividend component of its total return to investors, relative to other companies. Given market price variations, it would not be operationally feasible to try to stabilize the dividend yield, but it certainly is feasible to set a payout policy that makes the firm a "relatively high yield" or a "relatively low yield" company.[4]

Firms can target on one or more of these policy variables, thus setting a dividend policy. Then, if changes in the level occur, the dividend policy exhibits some degree of instability. Clearly, if firms knew which, if any, of these policy variables were most important to investors, and if they knew how investors reacted to the stability of dividend policy, then this information would be useful in attempting to maximize share price values.

Purpose of the Dissertation

As noted earlier, there have been numerous studies of the importance of dividend levels, but the various studies have reached conflicting conclusions. Therefore, one major purpose of the dissertation is to attempt to determine whether or not stock values and the required

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[4]A variant of this policy that is actually followed by a number of public utilities is to stabilize their "book yields," that is, the ratio of dividend to book value per share. This point was noted at a panel discussion by G. Schreiber, Vice President of Kidder Peabody, and J. Taggart, Treasurer of Tampa Electric Company.

rate of return on common equity are independent of the level of dividend payments. Also, since there have been relatively few studies of the importance of dividend policy stability, as opposed to dividend level, the second major purpose of the dissertation is to determine the effect of stability on stock prices and the cost of equity.

Format of the Dissertation

This dissertation is divided into five chapters. Following this introductory chapter, Chapter 2 discusses and highlights past literature on the theory and empirical testing of dividend level and variability effects on the required return of common stocks. The major theoretical arguments for dividend level irrelevancy and relevancy as well as empirical tests supporting each position are presented and evaluated. The limited material on dividend level variability is also examined.

Chapter 3 develops a detailed comparison of the Black and Scholes and the Bar-Yosef and Kolodny studies and attempts to reconcile the conflicting conclusions of these papers. Differences in their methodologies are discussed, and possible methodological reasons for their contrary results are pointed out. Both the B&S and B&K models are then retested using a common methodology and data base. Differences between these new and the original results are interpreted to explain whether they were caused by differing methodologies or because they focused on different forms of the dividend level variable.

In Chapter 4, the issue of dividend policy variability is tested; essentially, a dividend variability measure is added to the model developed in Chapter 3. Several different forms of dividend variability measures are used to determine which, if any, type of variability investors are most sensitive to. The results are interpreted into implications for firm's dividend policy decision makers.

The final chapter, Chapter 5, presents a summary of the issues addressed, including major results and conclusions of past literature and of this study.

CHAPTER 2
SURVEY OF DIVIDEND POLICY LITERATURE

Theoretical Studies

The literature on dividend policy may be divided into two types: (1) theoretical studies, some of which conclude that investors should be indifferent between dividends and capital gains, and therefore to corporate dividend policy, and some of which conclude that dividend policy should affect valuation and the cost of capital, and (2) empirical tests of the various theoretical positions. The major dividend studies are analyzed in this section.

Graham and Dodd

The first widely cited analysis of the effect of dividend policy on stock valuation appeared in Graham and Dodd's classic investment text, Security Analysis (1962).[5] On the basis of their experience in dealing with investors and analysts, Graham and Dodd concluded that, as a generalization, investors gave three times as much weight to dividends as to earnings when establishing the value of a security. Their valuation formula may be expressed as follows:

$$V = M(D + \frac{1}{3}E)$$

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[5]Sidney Cottle joined Graham and Dodd as a coauthor in the fourth edition of the book.

where V is the value of the stock, M is a multiplier, D is the dividend per share, and E is earnings per share.

Graham and Dodd, and others, tested the empirical validity of the formula, and they found that it was valid. However, as is noted later in the dissertation, statistical problems including errors in measuring the expected long-run levels of dividends and earnings per share make the accuracy of this conclusion questionable.

The Miller-Modigliani Model

Miller and Modigliani (1961), hereafter referred to as M&M, constructed a theoretical model which led them to conclude that dividend policy is irrelevant with respect to affecting the value of a firm's stock and its cost of capital. They proved this model under conditions of both certainty and uncertainty, but their proofs are based on two critical assumptions.[6]

Perfect capital markets. This implies that (1) no single buyer, seller, or issuer of securities can have a significant effect on price through his transactions, (2) all traders have equal and costless access to all available information concerning the price and other relevant characteristics of any security, and (3) there are no transfer costs or taxes on any security transaction, including taxes on dividends or capital gains.

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[6]Both proofs are essentially the same, so only the more realistic uncertainty model is discussed here.

Imputed rationality. An investor is said to impute rationality to the market when he assumes (1) that all other market traders are rational in the sense that they prefer more wealth to less and make no distinction as to whether increments of wealth are received in the form of dividends or capital gains, and (2) that other investors in turn assume that all other traders are also rational. M&M define this situation as "symmetric market rationality" because all traders behave rationally and assume that their fellow traders do likewise.

Based on these two assumptions, M&M look at the effect of the payment or nonpayment of the current dividend on the gross return to current stockholders. The return is shown by Equation (1),

$$\tilde{R}(0) = \tilde{D}(0) + \tilde{V}(1) \tag{1}$$

where $\tilde{R}$ is the gross return, $\tilde{D}$ is the dividend in period (0), and $\tilde{V}$ is the present value at the beginning of period (1) of the return stream from that point on. The tildes (˜) indicate that the values are not known with certainty, that is, they represent random variables. The firm is, and will remain, all equity, but Equation (1) does not allow for outside equity investments. If new outside equity is to be included, then Equation (1) must be modified as follows:

$$\tilde{R}(0) = \tilde{D}(0) + \tilde{V}(1) - \tilde{M}(1)\tilde{P}(1) \tag{2}$$

Here $\tilde{M}(1)$ represents the number of new shares which will be issued by the firm at the end of the current period, which is also the beginning of period (1), and $\tilde{P}(1)$ represents the price at which they will be issued. To determine $\tilde{M}(1)\tilde{P}(1)$, M&M use a simple accounting identity,

$$\tilde{M}(1)\tilde{P}(1) = \tilde{I}(0) + \tilde{D}(0) - \tilde{X}(0) \tag{3}$$

where $\tilde{I}(0)$ is the predetermined investment and $\tilde{X}(0)$ is the income of the firm in the current period. This equation simply states that the uses of funds (dividends plus internal investment) must equal the sources of funds (earnings plus outside funds generated by equity sales). Substitution of Equation (3) into (2) results in Equation (4).

$$\tilde{R}(0) = \tilde{X}(0) - \tilde{I}(0) + \tilde{V}(1) \tag{4}$$

Thus, allowing for outside equity sales, any dividend increase or decrease is exactly offset by a new equity increase or decrease, thus cancelling out any effects of the dividend increase on the return to current stockholders. In other words, the current stockholders give up a share of the future return stream which is exactly equal in value to the dividend they receive. M&M argue that, since $\tilde{R}(0)$ is unaffected by the dividend decision, then $V(0)$, the present valuation of that return, will also be unaffected. The same argument can be used for $D(1)$ and $V(1)$, or any other future $D(t)$ and $V(t)$, thus showing that the dividend decision is irrelevant to the valuation of the firm.

The addition of the debt financing alternative complicates the model. However, in their 1961 dividend article, M&M refer back to their 1958 capital structure article and argue that (1) in the absence of corporate taxes, debt policy is irrelevant and (2) therefore, dividend irrelevance is unaffected by the inclusion of debt. M&M do not, in their dividend article, consider whether or not debt financing in the presence of corporate taxes (properly treated) would leave their dividend irrelevance conclusion intact. This issue has not been explored in the theoretical literature.

M&M admit that their model is a simplification of the real world, and they comment on the possible implications of relaxing some of their assumptions. First, they argue that consideration of the tax differential on returns coming as dividends rather than capital gains should cause a preference for capital gains by individuals, for dividends by corporations with an 85% dividend exclusion, and indifference by nontaxable parties, assuming no other influences. If transactions costs are included, M&M argue that the net effect is unclear, but that irrelevance could still occur under certain circumstances.

> If, for example, the frequency distribution of corporate-payout ratios happens to correspond exactly with the distribution of investor preferences for payout ratios, then the existence of these preferences would clearly lead ultimately to a situation whose implications were different in no fundamental respect from the perfect market case. Each corporation would tend to attract to itself a "clientele" consisting of those preferring its

> particular ratio, but one clientele would be entirely as good as another in terms of the valuation it would imply for the firm. (M&M, 1961, p. 431)

The above condition would mean that a firm would have an optimal dividend policy, and this optimal policy would be its present policy. Thus, although any level of dividend payout is as good as any other, any change in levels would cause additional costs and possibly lower stock values for two reasons.

1. Investors who favored the original position would have to switch to another stock to regain that dividend level, thereby incurring transaction costs, and

2. the firm, in switching from a position where it satisfied a demand to a level where demand is already statisfied, may incur a softening in demand for its stock and a possible lower price.

Other investors who preferred the newly entered category would not switch from their present holdings in that category unless the underevaluation of the newly entering stock exceeded the transaction costs of switching to it. However, new investors entering the market who wanted stocks in this category would pick the new, undervalued entry until its price had been driven up to the level of similar stocks in the firm's new category.

Both of these effects would tend to be short run. However, the knowledge or belief that such a change might occur would cause at least some investors to value the possibly changing company lower than an otherwise identical

company which is not expected to change its policy. This uncertainty about the level of dividend contains two factors:

1. The probability of deliberate changes in the target dividend policy by the firm, and

2. the amount of deviation from the target policy that is normally allowed by the firm, that is, the "control limits" within which the firm allows its chosen policy to fluctuate.

A risk averting investor who had a preference for a particular policy would tend to want a low probability of deliberate changes and small deviations. This would favor a predictable, stable dividend policy by the firm.

There have been several articles written extending the M&M analysis. Articles by Farrar and Selwyn (1967) and Brennan (1975) have incorporated investor tax rates into the analysis and found that with the inclusion of this market imperfection, there should be a preference for capital gains over dividends because of the lower tax rate on capital gains. A third paper, by Arditti, Levy, and Sarnat (1976), which incorporated M&M's idea of the "information content of dividends," suggests that, because of imperfect markets concerning information on expected earnings, investors may use dividend level as a proxy of management's better estimate of the future earnings stream. If reported earnings are viewed with some skepticism, but investors perceive a higher dividend level

as providing greater assurance that the earnings will be maintained, then they may be willing to trade some of their after-tax return for that "information content" of the higher dividend level. ALS do not claim that this is the correct solution, but only that this explanation does fit with known theory and with the obvious fact that firms do feel dividends must be paid in spite of the tax advantage of capital gains over dividends.

The above extensions again raise the possibility of a dividend level effect: the first two posit a favoring of capital gains versus dividends, with the optimal policy being no dividend payment, while the third offers a possible explanation for a preference for a positive amount of dividends by investors. The third paper also implies that stability is wanted in the dividend stream so that changes are not random, but deliberate; hence have an information content.

The Gordon Model

Myron Gordon (1959) has offered an alternative model that suggests a preference for dividends. Gordon posits that investors focus on the case flow, or dividend stream, that they receive from their investment in determining investment value. Thus, a firm that pays out all of its earnings and uses depreciation to maintain its assets to produce at the present rate would be valued at[7]

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[7]Earnings must here be defined as economic earnings, not accounting earnings.

$$P_o = \frac{Y_o}{1 + K} + \frac{Y_o}{(1 + K)^2} + \frac{Y_o}{(1 + K)^3} + \ldots + \frac{Y_o}{(1 + K)^n} \qquad (5)$$

where

P_o = price or present value of the investment

Y_o = earnings paid out as dividends

K = required rate of return, for stocks of this risk, used to discount the dividend flow

The investors' required rate of return, K, is also the return this firm can receive on any additional investment of equal risk. If, instead of paying a dividend in the first year, the firm was to reinvest its earnings, its value would be

$$P_o = \frac{0}{1 + k} + \frac{Y_o + KY_o}{(1 + K)^2} + \frac{Y_o + KY_o}{(1 + K)^3} + \ldots + \frac{Y_o + KY_o}{(1 + K)^n} \qquad (6)$$

or

$$P_o = K \left[\frac{Y_o}{(1 + K)^2} + \frac{Y_o}{(1 + K)^3} + \ldots + \frac{Y_o}{(1 + K)^n}\right] \qquad (7)$$

$$+ \frac{Y_o}{(1 + K)^2} + \frac{Y_o}{(1 + K)^3} + \ldots + \frac{Y_o}{(1 + K)^n}$$

If it is assumed the firm will continue indefinitely ($n = \infty$) and that the investment is a perpetuity, then the first term in (7) becomes

$$\frac{K}{1+K} \left[\frac{Y_o}{1+K} + \frac{Y_o}{(1+K)^2} + \ldots + \frac{Y_o}{(1+K)^{n-1}}\right] = \frac{K}{1+K} \cdot \frac{Y_o}{K} = \frac{Y_o}{1+K} \qquad (8)$$

Now Equation (6) can be written as

$$P_o = \frac{Y_o}{1 + K} + \frac{Y_o}{(1 + K)^2} + \ldots + \frac{Y_o}{(1 + K)^n} \tag{9}$$

which is the same as Equation (5). In this case the change in dividend does not affect the value because it is exactly offset by an opposite change in the present value of future dividends; this is essentially the M&M position.

Gordon then hypothesizes that, due to uncertainty, a dividend postponed to future time periods will be more heavily discounted. In terms of the model this would be represented by

$$P_o = \frac{Y_o}{1 + K_1} + \frac{Y_o}{(1 + K_2)^2} + \frac{Y_o}{(1 + K_3)^3} + \ldots + \frac{Y_o}{(1 + K_n)^n} \tag{10}$$

where

$$K_1 < K_2 < K_3 < \ldots < K_n$$

We can define K in terms of one year forward rates. Let $K_{0,1}$ equal the one year rate at time 0, $K_{1,1}$ equal the on year forward rate at time 1, $K_{2,1}$ equal the one year forward rate at time 2, etc. Then $(1 + K_1)$ in Equation (10) equals $(1 + K_{0,1})$, $(1 + K_2)$ equals $(1 + K_{0,1})(1 + K_{1,1})$, and so forth. Then, we can rewrite Equation (10) as follows:

$$P_o = \frac{Y_o}{(1 + K_{0,1})} + \frac{Y_o}{(1 + K_{0,1})(1 + K_{1,1})} + \ldots \tag{11}$$

$$+ \frac{Y_o}{(1 + K_{0,1})(1 + K_{1,1}) \ldots (1 + K_{n-1,1})}$$

where

$$K_{0,1} < K_{1,1} < \cdots < k_{n-1,1}$$

Given P_o and Y_o, a single value for K, call it K', can be found that will represent a "weighted average" of the K's in Equation (11) and will solve it like an internal rate of return or yield to maturity.[8] This K' is then used as the cutoff rate for new investments.[9] Note that the future $K_{t-1,1}$'s are unknown to the firm; it can only solve for K'. However, K' cannot be used when determining dividend relevancy; rather, the individual $K_{t-1,1}$'s must be used. If the first year's earnings are reinvested, as was done for Equation (6), we can still form an equation analogous to Equation (5).

$$P_o = \frac{Y_o}{1 + K'} + \frac{Y_o}{(1 + K')^2} + \frac{Y_o}{(1 + K')^3} + \cdots + \frac{Y_o}{(1 + K')^n} \quad (5')$$

where K", the "weighted average" of the K_{t-1}'s, is found by solving Equation (5) given an observable Y_o and P_o. Using this K' as the necessary minimum reinvestment rate

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[8]The K' is a weighted average in the sense that $K_{0,1}$ appears in n terms, $K_{1,1}$ appears in (n - 1) terms and so forth; thus $K_{0,1}$ is weighted more heavily than the other K's with $K_{n-1,1}$ weighted the least. Given the increasing K's, K' will have a lower value than the geometric mean of all the K's, which weights each $K_{t-1,1}$ equally.

[9]As in Gordon's article, it is assumed that new capital investments have the same degree of risk as the firm's present assets.

for the firm, and again reinvestment the first year's earnings in a perpetuity at K', we get[10]

$$P_o = \frac{0}{1 + K_{0,1}} + \frac{Y_o + Y_o K'}{(1 + K_{0,1})(1 + K_{1,1})} \tag{6'}$$

$$+ \frac{Y_o + Y_o K'}{(1 + K_{0,1})(1 + K_{1,1})(1 + K_{2,1})} + \cdots$$

$$+ \frac{Y_o + Y_o K'}{(1 + K_{0,1})(1 + K_{1,1}) \cdots (1 + K_{n-1,1})}$$

Following this through as before results in Equation (8)'s counterpart for the first term.

$$\frac{K'}{1 + K_{0,1}} \left[\frac{Y_o}{1 + K_{1,1}} \quad \frac{Y_o}{(1 + K_{1,1})(1 + K_{2,1})} + \cdots \right. \tag{8'}$$

$$\left. + \frac{Y_o}{(1 + K_{1,1})(1 + K_{2,1}) \cdots (1 + K_{n-2,1})} \right] < \frac{Y_o}{1 + K_{0,1}}$$

Note that the series of denominators inside the brackets is of the same structure as that series for which K' is an average, namely, Equation (11). Since the series in (8') starts with $K_{1,1}$ instead of $K_{0,1}$, its average, call it K", will be larger than K', thus

$$\frac{K'}{1 + K_{0,1}} \cdot \frac{Y_o}{K''} < \frac{Y_o}{1 + K_{0,1}}$$

The increasing discount rate causes the present value of the additional future dividend stream resulting from the

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[10] P'_o replaces P_o because, according to the model, the reinvestment will affect the price, as shown below.

reinvested dividend to be less than the cash dividend, as shown in (8'). As a result, the price resulting from reinvestment, P_o', is lower than P_o, where the dividend is paid. The effect is a preference for dividends, according to the model, represented as the difference between K', the reinvestment rate calculated at time 0, and K", the actual reinvestment rate required.

Critics of Gordon's model point out several areas where it is thought to be deficient. First, tax effects favoring capital gains over dividends were ignored; this tax effect would tend to counter the dividend preference effect and may overwhelm it. With taxes included, the basic dividend preference would be modified by the individual's tax differential between capital gains and dividend income so that the present value of a stock for an individual will depend on his tax rate. Second, Gordon's assumption of a rising discount rate is questioned by many. Thirdly, Gordon does not allow for the sale of a portion of the securities as an adjustment mechanism for an inadequate dividend. Note, however, that (1) if all investors value stock according to the Gordon model, the sale of securities would only transfer them to another investor of similar preferences, so allowing a transfer of securities would not affect Gordon's basic conclusion without taxes, and (2) if brokerage costs are involved, such sale of stock is not really equivalent to dividends for investors who desire cash dividends.

There are differences in Gordon's model and M&M's model that make strict comparability impossible. M&M assume a fixed investment and allow frictionless ownership adjustments (shareholders buying and selling outstanding shares or the firm issuing or repurchasing shares with no transaction costs), while Gordon assumes that corporate investment varies with dividend policy and ownership adjustments are fixed at zero (no adjustment). Neither seems realistic as adjustments in both the level of corporate investment and in share ownership can be made, but only at a cost. Both the M&M and Gordon positions may be correct as far as they go, but until further work establishes a bridge, they cannot be reconciled at the theoretical level.

Empirical Dividend Studies

There have been many studies either directly testing the dividend relevancy hypothesis or testing for market imperfection effects that could affect dividend relevancy. The results have supported, depending on the study, both M&M's and Gordon's points of views. Because of advances in the methods used for testing, more recent tests avoid many of the problems of older studies and thus are better able to address the issue. However, problems still remain that have prevented a definitive conclusion to the controversy. Some of the more important empirical studies concerning dividend relevancy are of background interest.

Both Myron Gordon and David Durand published papers in 1959 that indicated a positive preference for dividends by investors. Gordon's main regression model was

$$P = \beta_0 + \beta_1\bar{d} + \beta_2(d - \bar{d}) + \beta_3\bar{g} + \beta_4(g - \bar{g})$$

where

P = year-end price

$\bar{d}$ = average dividend for the five prior years

d = current year's dividend

$\bar{g}$ = average retained earnings for the five prior years

g = current year's retained earnings

All variables were divided by book value to minimize scale effects. Running the regression over firms in four different industries, Gordon found that the coefficients on the dividend variables were all significant at the 5% level (except one) and averaged several times the retained earnings variables' coefficients. From this he concluded that investors value a dollar of dividends more highly than a dollar of retained earnings.

Durand ran regressions over samples of bank and public utility stocks using price as the dependent variable and various forms of book value, earnings, and the payout ratio as indipendent variables. He found in general that the payout ratio exerted a significant influence on price. Since the coefficient was positive, Durand felt it indicated a preference for dividends.

A study published in 1964, done by Irwin Friend and Marshall Puckett, attempted to reduce the confusion caused by conflict among different theoretical and empirical studies by pointing out problems with previous studies and by presenting new results. First, they noted that in past studies such as those cited above, no variable for risk was included in the models; thus, the prior studies were assuming either that risk was held constant or that it was uncorrelated with the independent variables, in particular with the dividend measures. They point to a logical argument that, if stable dividend payout is a management goal, firms with greater uncertainty about future performance would try to maintain a lower dividend payout than less uncertain firms, thus causing an inverse correlation between risk and dividend payout. From this they argue that, even if a positive relationship did not in truth exist, the fact that payout is correlated with the missing risk variable would tend to cause a positive coefficient for payout.[11] Friend and Puckett (1964) also hypothesize that a variable indicating how much external financing the firm uses may also be needed, and that dividend payout may serve as a proxy for this variable, but they admit the nature of any bias caused by omitting this variable is unclear. Other possible problems they point out are:

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[11]More recent studies, Black and Scholes (1974) and Bar-Yosef and Kolodny (1976), have shown this correlation to exist between historical "betas" and payout ratios.

(1) the dividend may be used for information regarding long-run earnings because of greater fluctuation in short-term earnings; (2) imprecise measurement of retained earnings gives its coefficient a downward bias, unlike dividends; (3) dividend payout differences may be, in part, the result rather than the cause of differences in price earnings ratios, causing results to be biased in favor of a dividend effect on price because the equation assumes a one-way causality between dividends and prices. Friend and Puckett describe the possible reverse causality as follows:

> It is entirely plausible that a price-earnings ratio which is regarded as high by management will result in external stock financing and high payout, while capitalization ratios regarded as low will result in heavier reliance on internal financing and consequently low payout. (1964, p. 665)

To reduce these problems, Friend and Puckett use several modifications.

1. A lagged variable measuring the difference between the individual firm P/E ratio and the average P/E ratio of the sample is included to proxy for any omitted firm variables.

2. Earnings are normalized to remove short-run fluctuations, thus reducing the relative effectiveness of dividends as a proxy for long-run earnings expectations.

3. A dividend supply equation is developed by adding a variable (identical to the variable described in (1) above), allowing the firm to adjust its current payout

to past market valuation of its future earnings, to the Lintner partial adjustment model,[12]

$$D_{it} = e + fE_{it} + gD_{i(t-1)} + h(P/E)'_{i(t-1)} \tag{12}$$

where

D_{it} = dividend in current period for firm i

E_{it} = earnings in current period for firm i

$D_{i(t-1)}$ = dividend in last period for firm i

$(P/E)'_{i(t-1)}$ = market valuation adjustment variable calculated as described in (1), for firm i.

Taking the original price relation equation,

$$P_{it} = a + bD_{it} + CR_{it} + d(P/E)'_{i(t-1)} \tag{13}$$

where

P_{it} = price of firm i's stock in current period

D_{it} = dividend in current period of firm i

R_{it} = retained earnings in current period of firm i

$(P/E)'_{i(t-1)}$ = lagged variable as described in (1)

and substituting in Equation (12) and the identity,

$$E_{it} = D_{it} + R_{it} \tag{14}$$

results in

$$P_{it} = [a + e(b - c)] + [c + f(b - c)]E_{it} + [g(b - c)]D_{i(t-1)} + [d + h(b - c)](P/E)'_{i(t-1)} \tag{15}$$

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[12] See Lintner (1956).

After obtaining regression coefficients for Equations (12) and (15), the coefficients for (13) can be derived and are theoretically free of bias due to effects of price on dividend supply. Friend and Puckett then run a series of regressions incorporating different sets of these modifications to show their effect on the results. They admit their results are tenuous and limited, but they point out that their major objective was to question results of similar past studies and to offer alternative answers that were more "plausible." In summarizing, they state "there is little basis for the customary view that . . . generally . . . a dollar of dividends has several times the impact on price of a dollar of retained earnings" (1964, p. 682).

James Van Horne and John McDonald (1971) approached the question of dividend relevancy from another angle. Van Horne and McDonald compared firms which both paid dividends and sold new issues of common stock with firms which paid dividends but did not issue new shares of stock. Firms in the first group may be thought of as issuing new stock in order to maintain a higher level of dividends, given their investment requirements, than would be true if they retained a higher percentage of their earnings. Van Horne and McDonald hypothesized that if the M&M indifference theory were strictly correct, then there would be no difference in value between the two groups of stocks. However, in view of the fact that companies do incur a positive flotation cost when selling stock,

Van Horne and McDonald stated that, if the value of companies which both pay dividends and sell new stocks is equal to or greater than the value of the companies which do not issue stock, this must indicate a preference for dividends, with the preference being strong enough to offset the flotation costs associated with the new equity issues.

Van Horne and McDonald tested this hypothesis with samples of 86 electric utilities and 39 electronics companies. To control for differences in risk, they ran the models over single industries and included a reciprocal of the times-interest-earned ratio as a financial risk variable. After testing the residuals of the two groups within each of the two industries, the authors found they could not say the groups were valued differently. In a second regression, with graduated levels of new equity as a percentage of outstanding equity as dummy variables, they found a significant positive coefficient for the first (0.001 to 0.05) level but none for any higher. This gives some support for the idea that, past a certain level, the costs of providing additional dividends through increased equity financing offsets the benefits of providing further dividends, either because of rising new equity costs or a declining preference for additional dividends.

Van Horne and McDonald admitted that their analysis is tentative and does have problems, such as involving only

two industries over only one year. It does represent an improvement over earlier studies in that adjustments are explicitly made for risk. Their results, though "less than conclusive," point to the existence of net preference for dividends within the sample of firms studied.

Two more recent studies by Black and Scholes (1974), hereafter also known as B&S, and by Bar-Yosef and Kolodny (1976), hereafter also known as B&K, utilized the CAPM framework to test for dividend relevance. These studies have differences, but they also have similarities, and they may be analyzed and compared with the same data base.

The B&S model is as follows:

$$E(R_i) = a_o + [E(R_m) - a_o]\beta_i + a_1(\delta_i - \delta_m)/\delta_m$$

where

$E(R_i)$ = the expected return on security i; the realized monthly return was used as a proxy for the expected return

a_o = intercept term; it is expected to be either R_F or the return on a zero beta portfolio

$E(R_m)$ = expected return on market; again, the realized monthly return was used as proxy

β_i = covariance between $\tilde{R}_i$ and $\tilde{R}_m$, divided by the variance of $\tilde{R}_m$

a_i = coefficient of the dividend variable

δ_i = dividend yield on security i

δ_m = dividend yield on the market

The first two terms of the equation are set up to allow for results consistent with the standard CAPM ($a_o = R_F$) or the

zero beta form (a_o = return on zero beta portfolio). The third term is a measure of a stock's dividend yield relative to the market's average; a preference for dividends would be indicated by a negative coefficient on the third term.

Bar-Yosef and Kolodny (1976) imploy the following model:

$$R_i = a_o + a_1\beta_i + a_2(D_i/E_i)$$

where

R_i = average geometric quarterly rate of return on security i over a specified test period

a_o = intercept term corresponding to a_o in the B&S equation

a_1 = coefficient on β corresponding to $E(R_m) - a_o$ in the B&S equation

β_i = beta coefficient for security i over the test period

a_2 = coefficient of the dividend variable

D_i/E_i = average dividend payout ratio (dividend divided by earnings) for security i over the test period

The first two terms perform the same basic function as in the B&S equation. The third term uses the dividend payout ratio as a measure of the amount of return received as dividends; a preference for dividends would be indicated by a negative coefficient on the third term.

The two studies came to opposite results; B&S found no significant relationship between dividends and return, while B&K found a dividend preference that tended to lower

the required rate of return on high dividend stocks. This is somewhat surprising, as the only basic difference in the two models relates to the dividend policy variable--B&S use dividend yields, while B&K use payout ratios. However, the data bases, time periods, and methodology (method for calculating betas, method for calculating holding period returns, etc.) employed in the two studies varied substantially, which could explain their different conclusions.

Certain potential problems exist in each study, further compounding difficulties in reconciling them. Black and Scholes' dividend yield variable may mask or counter the effect of dividend preference in that a rise in the dividend would cause a rise in price if the preference exists. Thus, the change in D/P could be dampened or countered. In the Bar-Yosef and Kolodny paper, several problems exist. First, their negative estimated coefficient on dividend payout could be the result of a bias created by errors in measuring security betas. No attempt was made to form portfolios to reduce these errors. A second bias, the direction of which is not clear, may result from a possible correlation of errors in betas and returns when both variables are measured over the same time period.

The Black and Scholes and Bar-Yosef and Kolodny studies, since they use more advanced risk analysis methodology, have the potential of explaining more clearly

the role of dividends than the earlier studies. However, their potential problems must first be worked out. The basic similarity of attack, a cross-sectional regression based on the Capital Asset Pricing Model (CAPM), plus a dividend variable, invites a direct comparison of the two studies.[13] Their results, if not caused by the problems mentioned above, may mean that investors are "keying" on one form of the dividend variable and not the other, that is, on payout rather than yield, or vice versa. Since the original studies were done over different time periods, it is also possible that a change in investors' preferences for dividends has caused the disparity. More recently two studies by Blume (1978) and Litzenberger and Ramaswamy (1979) found an effect contradictory to both the B&S and B&K results. Both of the more recent studies found an aversion for dividends and attributed it in part to a tax effect.

Blume made two major changes to the B&S model for his tests. First, he based his measure of dividend yield on the price at the beginning of the period instead of the end of the period as B&S did. Second, he aggregated monthly returns into quarterly returns. He reasoned that,

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[13]R. Roll (1977) has shown that empirical tests of the CAPM depend on the choice of the proxy for the unobservable market portfolio. If the reference portfolio is mean variance efficient (for the sample of stocks), the implications of the CAPM follow as a consequence of the algebra. The implications of Roll's work for this study will be discussed in the context of the findings.

since dividends were typically paid each quarter and not on a monthly basis, the two non-dividend month returns would not reflect a dividend influence and thus bias test results toward insignificance. Blume followed the portfolio formation and reestimation techniques used by Black and Scholes, then ran cross sectional regressions and pooled the resulting coefficients over time. Although his results showed a positive coefficient on dividend yield, Blume felt that the effect was larger than just a tax effect would produce, indicating that the yield variable could be proxying for something else.

Litzenberger and Ramaswamy also use a model very similar to the B&S formulation. Their principal differences are three.

1. They do not group securities to correct for measurement error in beta because of loss of information in grouping.

2. The expected dividend yield based on prior information is used for ex-dividend months and is set to zero in other months.

3. Their equation is estimated cross sectionally three different ways to produce Ordinary Least Squares, Generalized Least Squares, and Maximum Likelihood estimators. They contend that the former two are biased and inconsistent while the maximum likelihood estimator is consistent. From their test results Litzenberger and Ramaswamy conclude there is a strong positive relationship

between before tax expected returns and dividend yields. This effect is present, but to a lesser degree, even in non-ex-dividend months.

A very recent unpublished paper by Patrick Hess (1980) is essentially a criticism of the testing techniques used in the Litzenberger and Ramaswamy and the Blume studies. Hess contends that Litzenberger and Ramaswamy's third estimator is neither consistent nor the maximum likelihood. The consistency attribute requires that the true standard errors of all the beta estimates be known and that each estimation error be independent of all others but Hess argues there is no compelling reason to assume this. Hess then points out that some of the normality assumptions needed for the maximum likelihood estimator are violated; the error term in their stochastic version of their model is, in part, the product of two other variables assumed to be normal and thus cannot be normally distributed itself if the other two variables (β_i and R_m) are normally distributed. As a result one of the assumptions for the maximum likelihood estimator is violated. Hess also runs tests to show that the dividend effect varies across securities and so cannot be a uniform effect. Hess states that the effect demonstrated is not consistent with a tax effect on dividends, but is also inconsistent with no dividend effect. His conclusion is that the dividend effect may be proxying for something else but that since the relationship is not yet known, it cannot be used to

justify either particular dividend policies or selection policies for portfolio managers based on dividend yields.

Very little empirical work has been done on the Stable Dividend Hypothesis. One study that did address this issue is the paper by K. G. Mantripragada (1976), who used two measures of dividend variability: (1) the variance of dollar dividends per share, and (2) a "beta coefficient" derived from regressing dividends per share for a security against dividend per share for the Standard and Poor's Industrial Index. Little support was found for variance of dollar dividends as a relevant consideration in share price, but some was found for the dividend "beta" as a relevant measure. However, Mantripragada did not scale the variables to adjust for different prices, and no variable was included specifically to account for firm risk differences. Differences in scale could produce a correlation between the dependent variable, price, and the independent variables, dollar dividend level and price change, that is unrelated to the hypothesis tested. The price change variability and dividend variability measures may represent proxies for the missing firm risk measure, giving them a significance unrelated to the relationship tested. The author acknowledges the study as a first step and suggests that further refinements may be necessary.

CHAPTER 3
DIVIDEND LEVEL RELEVANCY

This chapter has two principal purposes. First, it compares two recent studies (B&S and B&K) which used the CAPM model plus a variable designed to capture the effects of dividend level on required returns. These two studies reached opposite conclusions regarding the effects of dividend levels, so it is important to attempt a reconciliation between them. The second purpose of this chapter is to examine possible changes in the effects of dividend policy over time. The B&S and B&K studies both employed a static analysis, testing for the average effect of dividends over a long time interval. Quite possibly, dividend payout policies might have different effects as investor preferences change, so tests are devised and run to explore for this possibility.

Comparison of the Two Studies

Methodology Differences and Possible Biases

In attempting to find an answer to the question of dividend level's effect on the required return of a stock, researchers for the most part have not specifically addressed the issue of how dividend level should be

measured: by payout ratio, dividend yield, or even dividend per share.[14]

The two recently published empirical works on dividend relevance, Black and Scholes, and Bar-Yosef and Kolodny, used dividend yield and payout ratio respectively. Both use their variable for the same purpose, to separate returns on stocks into two categories: (1) the dividend return realized immediately, and (2) the return portion from price appreciation whose realization can be postponed.

The B&S study uses dividend yield as its dividend policy variable in conjunction with the basic "zero beta" model. The reasoning is as follows: for a given level of risk there is a given level of required return, according to the CAPM. This return takes two forms, dividends and price appreciation, as shown in the following equation:

$$R = \frac{D + P_1 - P_0}{P_0} = \frac{D}{P_0} + \frac{P_1 - P_0}{P_0}$$

Note that the first term in the final formulation is dividend yield. Given a fixed level of return, the larger the dividend yield, the larger its percentage of the return. The percentage of the return represented by a given dividend yield, however, will depend on the size of the required

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[14]When dividends per share is compared with returns, as is done here, it needs to be weighted by some scaling factor, such as price per share in dividend yield, to remove magnitude differences that do not affect return. Because of this, dividend per share will not be used, but its ratio to price and earnings will be.

rate of return for that stock. The amount of return required will depend on the stock's risk as represented by its "beta."

B&K chose to use dividend payout ratios as their measure of return apportionment between dividends and price appreciation. They noted that the CAPM does not allow different weighting of the two forms of return and, reasoning that return to present stockholders must come from earnings, B&K introduce an additional variable representing the proportion of earnings distributed as dividends. If the additional variable's coefficient is significant, it would tend to indicate a difference in the relative weights assigned to dividends and capital gains returns, where capital gains are represented in the additional variable (implicitly) by the portion of earnings kept by the firm for reinvestment.

In theory, it is not clear that either the B&S or the B&K formulation is better than the other.[15] In testing, however, the B&S measure has a disadvantage because both the independent variable, dividend yield, and the dependent variable, return, have the same price as their denominator.[16]

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[15] In their study, B&S conclude this and seek to extend their results to payout ratios. They note a positive correlation between dividend yield and payout ratio and, based on this result, state that their results for dividend yield also hold for the other measure.

[16] To avoid other problems B&S regress the dividend yield of one period against the following period's return.

$$\text{Dividend Yield in Period 1} = D(1)/P(1)$$

$$\text{Return in Period 2} = [P(2) - P(1) + D(2)]/P(1)$$

Miller and Modigliani (1966, pp. 343-4) note that dividing both an independent variable and the dependent variable by a common denominator will lead to an upward bias in the coefficient to the extent that the denominator contains stochastic elements independent of the ratios' numerators. Combining the M&M observation with the efficient market hypothesis leads to the conclusion that such a bias is present and would work against finding a negative coefficient on dividend yield, which is the indication of a positive preference for dividends in this model.[17] The use of P(0) for dividend yield and P(1) for return will avoid this problem, as will replacing dividend yield with the payout ratio.

The two studies also use different methodologies for estimation and testing that make the results impossible to compare. The B&S study goes to considerable lengths to avoid introducing biases and inefficiencies. First, "betas" for each stock were estimated with five years of monthly data and used to rank the securities into five portfolios of varying "betas." Then, within each of these beta groups, stocks are split into five groups by dividend yield during

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[17]There are many studies, both theoretical and empirical, that support random short-run price changes in arguing for the existence of efficient markets. For examples see Samuelson (1965), Fama (1965 and 1970).

yield during the fifth year. Thus, B&S form a total of 25 groups, ranked by beta and by dividend yield. Portfolios were used instead of individual securities to reduce estimation error bias. Returns for each portfolio were then estimated over yet another (sixth) year to avoid correlation in estimation errors between the dependent and independent variables. The B&K study used individual security "betas" and payout ratios rather than average portfolio values, thus causing a potential measurement error bias in favor of their results.[18] Since portfolios were not used, the re-estimation period became unnecessary. A geometric mean return, used as the dependent variable, was estimated for each stock over the same period as was used to calculate its "beta"; this raises the issue of another bias due to correlation in measurement errors.

We see, then, that the B&S and B&K studies contain potential biases, more serious in the B&K paper, that could lead the authors to their respective conclusions even if those conclusions were in fact not true. In addition to differences in the dividend measure used and the biases, a third possible source of the conflicting conclusions may be the data used in the two studies. B&S ran their tests using data from 1926-66 compiled in tape form by the Center for Research in Security Prices of the University of Chicago, also known as CRSP. The B&K study

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[18] For a more detailed discussion of B&K's biases, see Manaster and Vanderheiden (1976).

used data for 1963-71 from the COMPUSTAT quarterly industrial file. The basic similarity of both models invites a direct comparison test run using comparable data with a common methodology designed to minimize the mentioned biases.

Methodology for Testing

The methodology chosen for the comparison test follows closely that used by Fama and MacBeth (1973). This methodology was chosen for two reasons. First, it avoids or substantially reduces most of the biases noted in earlier tests of this type, particularly the biases mentioned with respect to the B&K study. Second, it closely parallels the methodology used in the B&S study.[19] Althoug- the methodology described here is for the dividend level tests, the same basic procedures are used for the tests of the effects of dividend policy variability. Changes made for the variability tests are discussed in Chapter 4.

The data used in this study come from two sources. The CRSP tape provided security returns and dividend yields. Because CRSP does not have earnings information, the COMPUSTAT annual industrial tape was used to provide these data, along with dollar dividends, which are used to develop the payout ratios and dividend growth rates required for the variability tests. The need for the COMPUSTAT tape

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[19]Black and Scholes (1974) noted that, although different from theirs in some respects, this methodology should acheive similar results.

put limits on the study; only 20 years of data were available, one of which was required to calculate the portfolio payout ratios for the regressions. This requirement limited the test period to 19 years, 1958-76. Each firm represented was required to have at least nine consecutive years of data on CRSP and the first eight of those nine years on COMPUSTAT. In addition, since calendar year data were needed for some tests, but COMPUSTAT data are based on fiscal year, only firms whose fiscal year ended in December were used. The sample of firms available during each test year varied from 245 to 508 companies.[20]

The first step, estimation of the parameters used to form the portfolios used as observations in the regressions, is almost identical to the procedure used by B&S and described above. An example of the procedure using data from the first portfolio formation and re-estimation process is shown in Table 3-1. First, each security has four years of monthly returns regressed against the monthly market return to estimate its "beta." The fourth year's dividend yield is also calculated for use in ranking. All securities in the sample are then ranked lowest to highest based on "beta" and are divided into five groups, the first group having the 20% of the sample with the lowest "betas" and the fifth group having the 20% with the highest.

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[20]The limit on sample size was the number of companies listed on the COMPUSTAT tape that had the prerequisite data and were also present on the CRSP tape. Over the testing period, more firms that qualified were added to the COMPUSTAT tape, causing the sample size to increase.

TABLE 3-1

SAMPLE PORTFOLIO PARAMETERS

PORTFOLIO FORMATION PARAMETERS (1/50 - 12/53)					FINAL PARAMETERS (1/54 - 12/57)			FINAL PARAMETERS (1/55 - 12/58)		
Ranking by β		Subgrouped by D/P			Re-estimated			Re-estimated		
β Group	β	Portfolio Number	β	D/P	β	D/P	D/E	β	D/P	D/E
I	.4183	1	.4451	.0416	.6794	.0411	.530	.7123	.0366	.552
		2	.3689	.0551	.6321	.0502	.636	.5453	.0427	.631
		3	.4550	.0610	.5317	.0576	.624	.6165	.0469	.754
		4	.4042	.0721	.5361	.0631	.674	.5613	.0581	.606
II	.7848	5	.7808	.0344	1.0135	.0316	.494	1.0332	.0218	.506
		6	.7775	.0531	.9099	.0424	.579	.8218	.0346	.591
		7	.7587	.0655	.8876	.0505	.601	.8144	.0498	.670
		8	.8223	.0806	.9094	.0650	.592	.8721	.0630	.795
III	.9698	9	.9762	.0339	.9826	.0338	.486	1.1131	.0291	.483
		10	.9647	.0514	1.1176	.0437	.549	1.1592	.0393	.582
		11	.9566	.0651	1.1748	.0462	.563	.9397	.0465	.668
		12	.9816	.0845	.9307	.0591	.520	1.0884	.0518	.636
IV	1.1911	13	1.1585	.0348	1.3201	.0442	.430	1.1693	.0352	.595
		14	1.1914	.0633	1.1713	.0468	.530	1.2078	.0403	.759
		15	1.1873	.0754	1.1567	.0534	.757	1.1023	.0448	.653
		16	1.2270	.0878	1.1447	.0554	.628	1.0934	.0598	1.061
V	1.606	17	1.7505	.0119	1.4916	.0315	.377	1.3902	.0268	.318
		18	1.5317	.0513	1.4212	.0347	.471	1.2250	.0364	.485
		19	1.5571	.0717	1.5730	.0556	.640	1.3209	.0484	.676
		20	1.5845	.0903	1.2804	.0610	.626	1.3864	.0411	.641

The securities in each group are then ranked again by ascending dividend yield and are divided into four equally sized subgroups within each group based on their yields. This provides 20 portfolios with varying "betas" and dividend yields. Because of the two-criteria ranking process, the individual portfolio betas may not appear in ascending order, although the second ranking criteria, dividend yield, will within beta groups.

The portfolios were formed to reduce the possible bias from measurement in "beta" estimations of individual securities, yet a selection bias may still be present. A security with a large positive (negative) estimation error on "beta" would be included in a higher (lower) "beta" portfolio than otherwise, thus biasing the estimate of the portfolio's "beta."[21] To guard against this, the first set of estimations are dropped and the parameters are re-estimated over the next four years (years five through eight) of data for "beta" and the eight year for dividend yield and payout ratio. Each security remains in its original portfolio, but the calculated "betas" and dividend yields may change due either to changes in systematic risk or dividend yield or to measurement errors. The re-estimated betas and dividend yields shown in Table 3-1 show the changes. The tendency for the portfolio betas to move towards one is in large part due to adjustment for the

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[21] See Fama and MacBeth (1973), p. 615.

above mentioned selection bias. There is also a tendency for individual firm betas to move towards one in the long run, as reported in Blume (1973). This brings up the problem of non-stationarity of beta and its impact on the tests. If a beta is not stationary and trends towards one over time, then the true beta will deviate further from the estimated β the longer the estimate is not revised. This deviation would, like any estimation error, result in biased and inconsistent estimates by the cross-sectional regression coefficients. Three procedures have been adopted to minimize the effect of individual stock betas' non-stationarity. First, stocks are grouped into portfolios to reduce the effect of any individual beta's non-stationarity, as discussed in Blume (1971). Second, betas are re-estimated after ranking and grouping to remove any selection bias that would appear as a non-stationarity in the portfolio estimates. Third, the calculated betas, estimated on forty eight observations, are used for only one year before being dropped. It should be noted that from year to year in the 19-year testing period, the same numbered portfolio may well have a beta that varies because each year the portfolios are reformed and may contain different stocks. For example, in Table 3-1 see the final re-estimated parameters for portfolios used in the second year of regression. Since the new portfolio beta and dividend yield are compared with the corresponding new portfolio returns, changes in a particular number

portfolio's beta over time would not constitute a problem of non-stationarity of beta.

The re-estimated portfolio betas and dividend measures are the independent variables regressed against the portfolio's expected return which, to avoid correlation of measurement errors, is estimated over the ninth year. Ex post returns are used as proxies for the unobservable ex ante returns.

The equations for the cross-sectional regressions are

$$R_p = \gamma_0 + \gamma_1\beta_p + \gamma_2 L_p + \varepsilon$$

where

R_p = return on portfolio p

β_p = beta for portfolio p

L_p = dividend yield for portfolio p (B&S form)

or L_p = payout ratio for portfolio p (B&K form)

To maximize the number of regression coefficients available for the time-series tests, the portfolio parameters will be used in regressions across the 20 portfolios' returns for each of the ninth year's months in succession. That is, a cross-sectional regression is run with the calculated portfolio "betas" and dividend yields as independent variables and the portfolio returns for the first month of the ninth year as dependent variables, creating the first set of coefficients. The second cross-sectional regression uses the same independent variables but substitutes the ninth year's second month portfolio

returns as dependent variables, creating a second set of coefficients; the third regression uses the third month's returns as dependent variables and so forth. Thus 12 sets of monthly returns are regressed against the same portfolios, creating 12 sets of regression coefficients. All 12 regressions are then repeated using payout ratio as the dividend variable. The entire process is then advanced one year. New portfolios are formed based on data in years two through five, parameters are re-estimated based on data in years six through nine, and twelve more regressions are run using the monthly portfolio returns in year ten as dependent variables, yielding twelve more sets of regression coefficients. This process is repeated 19 times, the maximum number allowed by the data period, and yields a total of 228 sets of regression coefficients using dividend yield and 228 sets using payout ratio as the dividend variable.

A visualization of this series of cross-sectional regressions is presented in Figure 3-1. Each line represents one cross-sectional regression where the individual portfolios lie behind each other on the plane entering back into the page. Note that, although the portfolios' dependent variables change each month to give a new set of regression coefficients, each portfolio's independent variables remain the same for the first twelve regressions. The portfolios are then reformed, providing a new set of independent variables for the next twelve regressions.

$$\vdots$$

$$\gamma_{0,1} + \gamma_{1,1}\,\beta_{3,1} + \gamma_{2,1}\,L_{3,1} + \epsilon_1 = R_{3,1}$$

$$\gamma_{0,1} + \gamma_{1,1}\,\beta_{2,1} + \gamma_{2,1}\,L_{2,1} + \epsilon_1 = R_{2,1}$$

$$\gamma_{0,1} + \gamma_{1,1}\,\beta_{1,1} + \gamma_{2,1}\,L_{1,1} + \epsilon_1 = R_{1,1}$$

$$\gamma_{0,2} + \gamma_{1,2}\,\beta_{1,1} + \gamma_{2,2}\,L_{1,1} + \epsilon_2 = R_{1,2}$$

$$\gamma_{0,3} + \gamma_{1,3}\,\beta_{1,1} + \gamma_{2,3}\,L_{1,1} + \epsilon_3 = R_{1,3}$$

$$\vdots$$

$$\gamma_{0,12} + \gamma_{1,12}\beta_{1,1} + \gamma_{2,12}L_{1,1} + \epsilon_{12} = R_{1,12}$$

$$\gamma_{0,13} + \gamma_{1,13}\beta_{1,2} + \gamma_{2,13}L_{1,2} + \epsilon_{13} = R_{1,13}$$

$$\vdots$$

$$\gamma_{0,24} + \gamma_{1,24}\beta_{1,2} + \gamma_{2,24}L_{1,2} + \epsilon_{24} = R_{1,24}$$

$$\vdots$$

$$\gamma_{0,217}+\gamma_{1,127}\beta_{1,19}+\gamma_{2,217}L_{1,19}+\epsilon_{217} = R_{1,217}$$

$$\vdots$$

$$\gamma_{0,228}+\gamma_{1,228}\beta_{1,19}+\gamma_{2,228}L_{1,19}+\epsilon_{228} = R_{1,228}$$

$$\gamma_{0,m} + \gamma_{1,m}\beta_{p,n} + \gamma_{2,m}L_{p,n} + \epsilon = R_{p,m}$$

where

$\beta_{p,n}$ = "beta" for portfolio p for test year n, p = 1 to 20, n = 1 to 19

$L_{p,n}$ = dividend level variable (either dividend yield or payout ratio) for portfolio for test year n

$R_{p,m}$ = return on portfolio p for test month m, m = 1 to 228

Figure 2-1. Cross-Sectional Regression Series: $\gamma_{0,m} + \gamma_{1,m}\beta_{p,n} + \gamma_{2,m}L_{p,n} + \epsilon_m = R_{p,m}$

The yearly portfolio reformation, combined with the number of stocks in each portfolio, insure that the portfolio characteristics will remain relatively stable over time despite changes for individual stocks.

Individual R^2's and standard errors for the monthly cross-sectional regressions in the first, middle and last years of the test period of 19 years are presented in Table 3-2. This sample of 36 regressions are representative of the total 228 regressions run using dividend yield as the dividend level variable. The 228 regressions substituting payout ratio had R^2's that were approximately of the same magnitude or smaller as the corresponding dividend yield regression's R^2. Overall there was no pattern to the values; large R^2's varied across the months in no systematic way. The variability in R^2's (and coefficients and their "t" values) is expected because month to month ex post returns reflect random variations that will tend to approximate the ex ante expected returns only on average over time, assuming no systematic error in expectations. It is because of the unreliability of tests on a single month's regression coefficients that pooling tests are used.

The coefficient values for the individual cross-sectional regressions were then pooled and their averages calculated along with a "t" value for each average. The entire period of 1958-76 (228 observations) was then divided into subperiods; 58-63 (72 observations), 64-69

TABLE 3-2

R^2'S AND STANDARD ERRORS OF MONTHLY CROSS-SECTIONAL REGRESSIONS FOR THE FIRST, MIDDLE, AND LAST YEARS OF THE TEST PERIOD

$$R_p = \gamma_0 + \gamma_1 \beta_p + \gamma_2 \, (D/P)_p + \varepsilon$$

	1/58 - 12/58		1/67 - 12/67		1/76 - 12/76	
	R^2	Std. Error	R^2	Std. Error	R^2	Std. Error
Jan.	.5414	.0231	.9481	.0113	.7694	.0305
Feb.	.3988	.0174	.3193	.0148	.6211	.0282
March	.0782	.0139	.6267	.0150	.2110	.0121
April	.3225	.0159	.3215	.0161	.5092	.0129
May	.5331	.0126	.0929	.0135	.0173	.0166
June	.0363	.0162	.5905	.0182	.6592	.0114
July	.6936	.0154	.6202	.0169	.3290	.0149
Aug.	.1083	.0160	.0515	.0098	.6575	.0134
Sept.	.2826	.0189	.5610	.0106	.2346	.0112
Oct.	.3282	.0201	.0119	.0140	.2433	.0133
Nov.	.1027	.0169	.3543	.0134	.5503	.0163
Dec.	.1486	.0186	.1777	.0177	.2242	.0134

(72 observations), and 70-76 (84 observations), and averages and "t" values again calculated. The results are presented in Table 3-3.

The results from Table 3-3, based on a two-tailed test at the 0.05 level, support the conclusion of Black and Scholes that there is no systematic effect on returns that can be explained by a dividend effect in conjunction with the basic Capital Asset Pricing Model. The results do not support the Bar-Yosef and Kolodny conclusion that there

TABLE 3-3

MONTHLY COEFFICIENT AVERAGE AND ITS "t" VALUE
CROSS-SECTION REGRESSION

$$R_p = \gamma_0 + \gamma_1 \beta_p + \gamma_2 \text{ (Dividend level)}_p$$

γ_2 for Level Measure	$\bar{\gamma}_0$	$t(\bar{\gamma}_0)$	$\bar{\gamma}_1$	$t(\bar{\gamma}_1)$	$\bar{\gamma}_2$	$t(\bar{\gamma}_2)$
	Full Period		1/58 - 12/76		(N = 228)	
Dividend Yield	.001	(.32)	.008	(1.86)	.067	(1.35)
Payout Ratio	.006	(1.35)	.006	(1.38)	-.000	(.05)
	Subperiod 1		1/58 - 12/63		(N = 72)	
Dividend Yield	.011	(1.78)	-.001	(.22)	.105	(1.33)
Payout Ratio	.013	(2.27)	-.002	(.36)	.004	(.82)
	Subperiod 2		1/64 - 12/69		(N = 72)	
Dividend Yield	.007	(1.07)	.018	(2.51)	.016	(.19)
Payout Ratio	.004	(.63)	.013	(2.04)	-.012	(1.83)
	Subperiod 3		1/70 - 12/76		(N = 84)	
Dividend Yield	.000	(.01)	.007	(.79)	.078	(.86)
Payout Ratio	.002	(.21)	.005	(.60)	.006	(.57)

exists a preference for dividends (signified by a negative coefficient on the dividend level variable) that allows a lower yield on high dividend level stocks than on lower dividend stocks of equal risk. The results do support the contention that the original (B&K) results were due to biases resulting from their methodology.

It should be noted, however, that even beta was insignificant in two of the subperiods and the constant term fared even worse. This is consistent with results reported for similar subperiods in other studies that found that the basic linear beta relationship does hold over longer periods.[22] One explanation for these problem periods is that for substantial lengths of time, realized returns do not approximate the corresponding periods' expected returns.[23] Such phenomena cannot be overcome until better proxies are devised for ex ante returns.

Tests for a Varying Dividend Level Effect

The above tests have looked for an average effect over long (five years or more) periods of time. To be found, the effect would have to be consistently negative (or positive) for much of the test period. Although sufficient, such a condition is not necessary for a dividend level effect on return. The effect could vary around zero over time, possibly because of some pattern in dividends themselves or because of some external factor. One such factor could be a changing preference for capital gains versus dividends, depending on investors' emphasis on saving (greater earnings retention) or current consumption (higher earnings payout). To test for a changing

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[22] For example see Fama and MacBeth (1973).

[23] W. F. Sharpe (1978) noted, in discussing recent tests of the CAPM, that this was true of the 1968-73 period used in the discussed tests.

effect, independent of outside factor influence, serial correlations were calculated between a given month's dividend level coefficient and the coefficient 1 through 36 months later. The serial correlation coefficients, on both dividend yield and payout ratio, varied from positive to negative in no easily discernible pattern and had absolute values less than 0.2 (except on the payout ratio coefficient for three months later, which was -0.29). The evidence does not support the hypothesis that there is a general significant or predictable cycling effect, independent of outside forces, of dividends on the required return on stocks.

One possible outside influencing factor on dividend level effect is changing investor preference for current versus future income. Since investors' preferences are not directly measurable, a proxy is needed. The two proxies chosen were: (1) personal savings as a percent of disposable income, and (2) the rate of change in money supply measure M5 minus M1 (time and savings deposits at commercial banks and non-bank thrift institutions).[24]

It is hypothesized that an increased savings percentage will proxy for an increased desire for saving among investors that will manifest itself in an increased preference for capital gains versus dividends. This would

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[24]M1 and M5 as used here are the old definitions of money measures. M1 is equal to the new M1A minus demand deposits held by foreign banks and official institutions. M5 has no counterpart in the new definitions.

be supported by a positive coefficient on the savings percentage in the model,

$$\gamma_{2,t} = \delta_0 + \delta_1 S_t$$

where

$\gamma_{2,t}$ = the coefficient on the dividend variable, from the previous cross-sectional regressions over time t = 1,76

S_t = personal savings as a percent of disposable income

The savings data are obtainable quarterly which necessitated consolidating the dividend coefficients to quarterly data from monthly, reducing the number of observations from 228 to 76.

Besides the reduction of observations, this proxy suffers from another possible drawback: it represents relative changes in personal savings but not in corporate or institutional preferences, if any. The differences in taxation and the facility of dealing in larger blocks with accompanying lower transaction costs, as well as possible more active trading, may cause the latter two groups to value dividends differently from the private investors. Thus, even if this measure correctly proxies for private investor preferences, it is not clear that will do so for the other two groups' preferences.

Both δ_0 and δ_1 had low "t" values (Table 2-3) when used in concert with the coefficients on both dividend yield and payout ratios; this supports the null hypothesis

TABLE 3-4

COEFFICIENTS AND "t" VALUES FOR
$\gamma_{2,t} = \delta_0 + \delta_1(\text{PERSONAL SAVINGS/DISPOSABLE INCOME})_t$
QUARTERS 1/58 - 12/76 (N = 76)

γ_2 = Coefficient on:	δ_0	δ_1
Dividend Yield	0.563 (0.62)	-0.60 (0.43)
Payout Ratio	0.042 (0.51)	-0.007 (0.55)

against the correlation of percent of income saved to a preference for either capital gains or dividends.

The second proxy (M5 - M1), includes time and savings deposits at commercial banks and non-bank thrift institutions, excluding demand deposits. It was expected that such deposits will grow over time so the proxy used was the rate of change in the net measure. It was posited that an abnormal growth rate in the measure would indicate an investor preference for saving which would not only cause a larger than normal increase in the above savings devices but also result in a preference for capital gains over current dividend income. If the above scenario is true, it should exhibit itself through a positive coefficient on the money measure in the following model:

$$\gamma_{2,t} = \delta_0 + \delta_1 M51_t$$

where

$\gamma_{2,t}$ = the coefficient on the dividend variable, from the previous cross-sectional regression, t = 1,214

$M51_t$ = percent change in (M5 - M1) in period t = 1,214

To reduce the effects of serial correlation of the independent variable, the Cochran Orcutt technique was used.

TABLE 3-5

COEFFICIENTS AND "t" VALUES FOR

$\gamma_{2,t} = \delta_0 + \delta_1 \,\%\Delta(M_5 - M_1)_t$

WHERE γ_2 = COEFFICIENT ON:

	Dividend Yield		Payout Ratio	
Period	δ_0	δ_1	δ_0	δ_1
2/59-12/76 (N = 214)	-.050 (0.40)	13.71 (1.07)	.137 (1.40)	1.58 (1.56)
3/59-12/64 (N = 70)	-.484 (1.90)	66.42 (2.42)	.022 (1.51)	2.83 (1.78)
2/65-12/70 (N = 71)	-.165 (1.03)	35.07 (1.84)	.018 (2.18)	1.53 (1.50)
2/71-12/76 (N = 71)	.728 (2.11)	-66.64 (2.10)	.022 (0.55)	-1.60 (0.44)

The results of this test are mixed. When run over the full time period for which information on M1 and M5 was available, 2/59 to 12/76, the results were not significant for either dividend yield or payout ratio (Table 3-5). Yet when the large sample was broken down into three approximately equal subperiods, the first (3/59-12/6) period yielded a positive significant coefficient on the money measure when regressed against dividend yield, the second (2/65-12/70) a positive but not significant coefficient, and the third (2/71-12/76) a negative significant coefficient! The same three subperiods, when run with payout ratio as the dependent variable, showed insignificant results for the independent variable's coefficient.

Two things should be noted in connection with the above results. First, the period from 1968 forward until recently have been years in which ex post returns on stocks in general have not been consistent with reasonable expectations as noted earlier. Since the above tests rely on using ex post returns as proxies for the ex ante data needed, the results are suspect.

Second, it has been suggested that (M5 - M1) may act as a competitive use of investors' savings such that an abnormal rise in the measure's rate of growth could be caused by a switch of funds out of common stock. If this is true, the sign of the coefficient, and its significance, will depend on whether the shift concerns common stock in general, with high or low dividend yields being immaterial, or whether the shift from institutional savings is to high or low dividend stocks.

To test for this preference, further refinements are needed in the proxy. Would the aggregate preference result from the particular composition of investors in the market, where different groups have different preferences? If so, a measure capturing the shift in composition might correctly proxy the shifting preference and thus highlight its effect. However, a preference change could also result, not from a changing composition of investors with fixed preferences, but from the same investors with changing preferences. This would necessitate an entirely different proxy. More detailed information on market

participants, their relevant circumstances, and their preferences are required. This information could perhaps be obtained through a market survey. Such information was not available for the period tested. The measures used, although fraught with difficulties, appeared to be the best available on a consistent basis. Better proxies may well produce better results.

Summary

In summary, the various tests support the conclusion that there is no detectable effect of dividend policy level on the return required from common stock. The comparison test of the B&S and B&K studies run using a common methodology and common data supported the B&S conclusion that no measurable difference exists in the observed return on a stock based on its dividend level. The comparison did support the contention that the original B&K results, supporting a preference for dividends, resulted from biases created by their methodology. The possibility of a fixed dividend preference cycle was not supported by the serial correlation coefficients calculated on the dividend coefficients. The two tests run to determine if there existed a changing preference for dividends over time, using personal savings as a percent of disposable income and the rate of change of M5 minus M1 as proxies for the change in an aggregate preference, yielded results which did not support such a conclusion.

Overall, the tests performed supported the conclusion that there is no measurable effect of dividend level on a stock's required rate of return. It may be that such an effect does in fact exist, but that it is masked by other effects. However, further study will require further refinements in estimation, proxying, and methodology than have been presented here to resolve the issue.

CHAPTER 4
DIVIDEND LEVEL VARIABILITY RELEVANCY

The issue of the relevance of dividend variability for valuing a stock's expected return stream is closely related to that of dividend level's effect, the variability simply being changes in the level. Yet there has been little attention paid in academic literature to the possible effects of this variability on the required rate of return or its effect on tests of level relevancy. The purpose of this chapter is to test for the effect of dividend policy variability on the required rates of return of common stock. If investors have an aversion to return variability, then, given market imperfections, they may also have an aversion to variability in the forms of that return, dividends or capital gains. First, tests will be run to determine if there is a static dividend policy variability effect. It is also possible that the effect of dividend policy instability changes over time or the relative importance of dividends to investors changes, so tests are formulated and run to explore for this possibility.

Theory

First, in theory, under perfect capital market assumptions, dividend variability does not matter as investors would be indifferent about the form of return, as shown by M&M (1961). But the conclusion changes when imperfect capital markets are assumed.

Introducing tax differences between dividends and capital gains creates a preference for dividends by corporations with the 85% dividend exclusion and a preference for capital gains by other taxed investors. If these different groups of investors do form clienteles of stockholders in firms with differing policies, as M&M have suggested, then varying from those policies should cause dissatisfaction among the stockholders and an impetus to switch to a firm that better approximates their dividend preference.[25] With no transaction costs, the only possible effect would be a drop in stock price because of a lesser demand for the varying and uncertain policy of the firm.[26] This undervaluation should be quickly removed by tax exempt investors who have no preference for the form of return. With transaction costs, this switching process is retarded, although the price should still readjust as new tax-free investment, which would have the same cost of buying any stock, takes advantage of the undervaluation.

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[25]Elton and Gruber (1970) support the clientele effect, showing the different tax rates of marginal stockholders based on ex-dividend price changes.

[26]This assumes investors do prefer that firm's policy but are risk averse.

Transaction costs themselves can affect the importance of a stable dividend policy, but the effect can be both positive and negative. Investors substituting capital gains for dividends to stabilize current income will incur a transaction cost, lowering the after-cost value of the capital gain. This cost would lead these investors to prefer that the firm stabilize the dividend. On the other hand, a firm which must use outside financing to maintain a stable dividend, because of varying optimal investment amounts and varying internally generated funds year to year, will incur flotation costs. This would lead stockholders to prefer a more variable, residual dividend policy on the part of the firm to avoid this additional cost. The net impact of these two contrary effects is not clear.

Under uncertainty, if it is assumed that firms' managers have more accurate estimates of future expected returns than investors, an "information content" of dividend changes may be present.

It is generally agreed that dividends have tended to be more stable year to year than earnings, largely because the managements of firms have more control over dividends and have believed a stable dividend was important. This induced stability has given rise to the theory of the "information content" of changes in the level of dividends. Simply stated, the theory argues that a rise in dividends indicates that management forecasts a higher future level of earnings while a drop shows the reverse situation.

Empirical Tests

Pettit (1972) and Watts (1973) each tested price reaction to single announced changes in dividend level; however, as is the case with so many dividend studies, they came to opposite conclusions. These tests, however, were designed to test for market efficiency in anticipating the "information content" of the announcements and not for the effect of a varying policy on required return. Rather than looking at one-time changes in dollar dividends, as was done by Pettit and Watts, this study will examine the effect of the overall level of variability across time in dividend policy. There are actually two levels in the hypothesis. First, does the level of dividend variability affect the return required on the stock? Second, if there is an effect, what measure of dividend variability best measures it, or, what should value-maximizing managers try to stabilize?

One study that directly addressed the issue of variability was done by K. G. Mantripragada (1976) using price as the dependent variable and the level and variance of dollar dividends and capital gains (losses) as the four independent variables. A second model replaced the two variance measures with regression coefficients obtained by regressing each stock's dividends and capital gains against those for the Standard and Poor's Industrial Index. Both models were run over a cross section of firms from the COMPUSTAT tape. Upon testing, the first model's

coefficients on the level of dollar dividends and capital gains were found to be positive and significant. The coefficients on dividend variability, which were expected to be negative and significant, were not significant and not consistently negative. Tests of the second model resulted in the coefficients on the levels of dividends and capital gains and the coefficient the capital gains "beta" being positive. The coefficients on the dividend "beta" were negative and significant. With regards to a preference for dividend stability, Mantripragada concluded that "some support was found for the proposition . . . that one might expect to find a systematic negative relationship only between stock prices and the nondiversifiable instability in their dividend streams." Two possible biases are noted that could affect his results of an aversion only for undiversifiable instability. First, differences in price magnitudes were not adjusted for so that a firm, by simply having a two-for-one stock split, would find its dollar price, dividend level and variability, as well as capital gains level and variability, all move down together. Such scale changes across firms would produce a positive coefficient for each of the variables used even if no other effect were present, which is exactly the result reported for three of the four variables' coefficients. The fourth variable, dividend variability, was expected to have a negative coefficient. Although negative for most of the periods, the coefficient was

negative and significant in only 2 of the 12 periods; the scale effect would create a positive relationship that would work to offset a true negative relationship, if any.[27] A second possible bias is created by the omission of a variable designed to present individual firm risk as suggested by Friend and Puckett (1964) and discussed in Chapter 1. Both of these potential biases also exist in the second model. Since the first is an upward bias and the second is a downward bias, the net effect on the results is not clear unless the magnitude of each of their effects is known, causing the results of the tests to be suspect.

Methodology for Testing

The methodology used for the dividend policy variability tests is the same as that used for the dividend level tests and described in Chapter 3 with the following exceptions:

1. The dividend policy variability measures were calculated over the eight years used for portfolio formation and parameter re-estimation.

2. Because 8 years of data were used to calculate the dividend variability measures and only 20 years of full data were available, only 12 years of monthly returns were available for the cross-sectional regressions. As a

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[27] See Miller and Modigliani (1966).

result, only 144 sets of cross-sectional regression coefficients were available for testing.

The equation for the cross-sectional regressions is

$$R_p = \gamma_0 + \gamma_1\beta_p + \gamma_2 L_p + \gamma_3 V_p + \varepsilon$$

where

R_p = return on portfolio p

β_p = beta for portfolio p

L_p = dividend yield for portfolio p

V_p = variability measure (dividend β) for portfolio p

The variability measure used was the covariance of changes in dividend yield with changes in the market dividend yield divided by the market yield variance, in effect a dividend beta similar to the one used by Mantripragada.[28] The market index used was simply the CRSP market return index with dividend yield minus the index without dividend yield. The dividend yield beta was used for two reasons.

1. As noted by Mantripragada, rational investors will hold a portfolio of stocks for diversification and thus will not be concerned with the unsystematic portion of dividend policy variability.

2. The fluctuation in dividend yield can result from fluctuations in the dividend policy, which may concern

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[28]Mantripragada's beta was based on dollar dividend instead of dividend yield. The scaling problem still is a factor with dollar dividends. Other formulations considered for this study were the variability of payout ratio and dividend growth. Further information on these alternatives is discussed in the following footnote.

investors and is then the effect this study is testing for. However, fluctuations in dividend yield will also result from fluctuations in stock price, which is not the concern of this study and which will interfere with the tests for the relevant market. The market index should be fairly stable with respect to dividend policy effects but will vary due to broad movements in market prices. This will help reduce the effect of stock price variability but, unfortunately, will not eliminate it.

Thus, the relevant variability is only the systematic portion, as measured by the above beta.[29] Since it is expected that, if relevant, increased variability would cause an increase in the required return, the coefficient should be positive.

The level measure was included to eliminate the possible effect of the level and variability measures proxying for one another. A low dividend policy would prove easier to maintain with a fluctuating earnings stream than would a high dividend. Thus a high dividend policy would tend to produce a higher policy variability for a given variability in earnings. If investors have a preference for dividends and an aversion for dividend

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[29]Measures other than the dividend yield beta were suggested. Other measures whose variability could be considered were dividend growth rate and dividend payout ratio. Other variability measures suggested were variance (or standard deviation), coefficient of variation, and negative semivariance. Tests were run on these alternative policy and variability measures but the results were not substantially different than those reported for dividend yield beta.

policy variability, and higher variability is associated with higher dividends, inclusion of a measure for only one would cause it to proxy for the other opposite effect, reducing the apparent effect of the one included. For this reason the model includes both, with additional tests run with each measure suppressed in turn.

For the first test, the above model's individual coefficients were grouped over the entire 12-year period; then they were grouped over two equally sized subperiods. A "t" statistic was then calculated on each variable's group of coefficients.

The results, as shown in Table 4-1, do not support the hypothesis that dividend yield variability, in the form of a yield beta, affects the return on stock demanded by investors. At the 0.05 level in a one-tailed test, none of the coefficient average "t" values for γ_3 are significant. The cross-sectional model was also run with γ_2, and γ_3 in turn, suppressed to observe any possible cross effects. Although the coefficient averages' "t" value on dividend yield is positive and significant in the first subperiod, the conclusion that this supports the hypothesis of an aversion for dividends is not warranted. With γ_3 suppressed, the above model is the same as that tested in Chapter 3 on the same cross-sectional data. Since the only change was a shift in the dates of the test periods and no reason could be given why this should cause the

TABLE 4-1

MONTHLY COEFFICIENT AVERAGE AND ITS "t" VALUE

Cross-Sectional Model: $R_p = \gamma_0 + \gamma_1 \beta_p + \gamma_2$(Dividend Yield) $+ \gamma_3$(Dividend Yield Beta)

1/65 - 12/76 (N = 144)		1/65 - 12/70 (N = 72)		1/71 - 12/76 (N = 72)	
γ_2	γ_3	γ_2	γ_3	γ_2	γ_3
0.130 (1.32)	0.002 (1.07)	0.357 (2.50)	0.001 (0.59)	-0.097 (0.73)	0.003 (0.89)
---	0.202 (1.41)	---	0.022 (0.16)	---	0.383 (1.52)
0.156 (1.65)	---	0.354 (2.38)	---	-0.042 (0.38)	---

change in results, other than spurious correlation, no change in the conclusions of Chapter 3 is justified.

Other Tests

Although the above results support the conclusion that the level of variability in dividends does not affect the required return on common stock, the test was for an essentially static effect. In fact, the effect may vary over time depending on the relative importance placed on dividends.

To examine this possibility, the coefficients on dividend variability were used as dependent variables in the following two equations:

$$\gamma_{3,t} = \delta_0 + \delta_1 S_t$$

where

$\gamma_{3,t}$ = coefficient on dividend yield beta, t = 1,48

S_t = personal savings as a percent of disposable income, t = 1,48

and

$$\gamma_{3,t} = \delta_0 + \delta_1 M_{51,t}$$

where

$\gamma_{3,t}$ = coefficient on dividend yield beta, t = 1,143

$M_{51,t}$ = monthly percent change in money measure $M_5 - M_1$, t = 1,143

The personal savings data are reported quarterly; thus, the monthly dividend data were aggregated into quarters and only 48 observations were available. The money

measure data exhibited serial correlation so the Cochran Orcutt technique was employed, resulting in the loss of one observation. For the money measure, the full period was again divided into two subperiods.

It was hypothesized that, as investors became more concerned with current consumption, the personal savings percentage would fall and, because of the greater preference for current income, more emphasis would be placed on dividends and a stable dividend policy. This would result in a negative coefficient on the savings variable in the above equation and a positive constant. In the second model, money measure M_5 minus M_1 also proxies for the preference for savings versus current income and thus should carry the same sign as savings is expected to in the first model. The results are reported in Tables 4-2 and 4-3.

TABLE 4-2
COEFFICIENTS AND "t" VALUES FOR
$\gamma_{3,5} = \delta_0 + \delta_1$ (PERSONAL SAVINGS/DISPOSABLE INCOME)$_t$

Period	δ_0	δ_1
1/65 - 12/76 (N = 48)	0.322 (0.08)	0.091 (0.16)

TABLE 4-3
COEFFICIENTS AND "t" VALUES FOR
$\gamma_{3,t} = \delta_0 = \delta_1 \%\Delta(M_5 - M_1)_t$

Period	δ_0	δ_1
2/65 - 12/76 (N = 143)	-0.069 (0.18)	33.07 (0.87)
2/65 - 12/70 (N = 71)	-0.215 (0.87)	40.15 (1.38)
2/71 - 12/76 (N = 71)	0.323 (0.28)	2.79 (0.03)

For the first model, the coefficient on savings was of the wrong sign and insignificant at the 0.05 level for a one-tailed test. The constant was of the correct sign but was also insignificant. For the second model, the coefficient on M_5 minus M_1 was of the wrong sign and insignificant in the full period and both subperiods. The constant varied in sign and was not significant. These results support the contention that there is no changing preference for stable dividend policy based on a preference for current income as proxied by the independent variables. The same caveats expressed about the use of these proxies in Chapter 3 apply here. The finding of an aversion for dividend measure variability, if it exists, must await more refined techniques or a better specification.[30]

Summary

In summary, the tests on dividend level variability relevance found no support for the hypothesis that there is an aversion to dividend variability that is reflected in the return required on a common stock. The test for a constant aversion for dividend variability, run over the full period available for testing and two subperiods, did not yield significant results. Further tests designed to detect a varying level of aversion provided similar

[30] Op. cit.

results. The variability coefficients from the cross-sectional equations, when run over time against two proxies for shifting preferences, yielded results that did not support the hypothesis of a shifting aversion for variability.

CHAPTER 5
SUMMARY OF ISSUES AND RESULTS

Past Theoretical Studies

The question of dividend relevancy is of concern to firms in making their financing decisions. The return to the firms' equity investors can come either in the form of cash dividends or capital gains from the increase in the price of the common stock. If investors are indifferent to which form they receive their return in, that is, they have neither a preference nor aversion for dividends versus capital gains, firms can ignore dividend policy considerations in their financing decisions without any adverse effect on the value of shareholders' equity.

There are theoretical studies that argue that investors are indifferent to the form of return under perfect markets and studies that argue for a preference of cash dividends. The best known proponents of the irrelevance of dividend level to valuing common stock are Miller and Modigliani (1961). They argue that, given an optimal investment budget, dividend increases would be financed by issuance of new common stock. Since the new common stock will share in future earnings, the present value of the lost earnings to the original stockholders

will just offset the dividend increase, leaving the original stockholders' wealth unchanged. Since this wealth will be unchanged, the present stockholders would be indifferent to the dividend increase; if they wish more current income, they can sell a portion of their stock holdings. Although their argument assumes an all equity firm, they note that, based on their previous argument that debt level is irrelevant to firm valuation, including debt financing would not change their dividend irrelevance conclusion.

Miller and Modigliani admit that their assumptions differ from actuality, but state that irrelevance of dividend level could still result if differing investors' preferences were satisfied by the proper mix of differing corporate dividend policies. Thus whatever dividend level a firm has is optimal for its own stockholder clientele and any change would disturb the equilibrium and thus be suboptimal. This assumes that the market mix of investor preferences will not change.

Others have extended the analysis to include certain market imperfections. Studies by Farrar and Selwyn (1967) and Brennan (1975) allowed for different tax rates on dividends versus capital gains and found there should be an aversion for dividends because they are taxed at a higher rate. Arditti, Levy, and Sarnat (1976) relaxed the assumption on complete and universally available

information on expected earnings and argued that investors may perceive that dividends provide information on a firm management's better estimate of future firm earnings. Further, investors are willing to give up some after-tax return to receive the information provided by dividends and hence investors have a preference for dividends in spite of the higher tax rate as opposed to capital gains.

Despite a finding of dividend irrelevancy in the original paper, the extensions raise the question of a dividend influence on required return. A tax differential would cause an aversion for dividends by individual investors, causing a higher required before tax rate of return on stocks with a higher dividend level. An "information content" of dividends means a preference for some positive level of dividends, causing a lower required rate of return for stocks with a dividend level sufficient to provide the desired signal and thus reduce investors' uncertainty about future returns. The above studies also imply a relevance for the variability of dividend policy that is separate from the question of any dividend level effect. An often varying policy would not provide the information investors may desire and would cause those investors with a tax related preference for certain dividend levels to incur transaction costs in switching from a firm as its policy changed. Because dividend variability may be an issue separate from the dividend level question, separate tests were designed to address this question.

Another view is that there is a basic preference for cash dividends because a return in hand is more certain than a postponed return. Gordon (1959) theorizes that, because the future dividend flows of a firm are increasingly uncertain, future dividends will be more heavily discounted with each period further in the future they are expected to be received. Assuming that the alternative to paying out a dollar as dividends is to reinvest it for a future return rate equal to the present calculated cost of capital, Gordon argues that the delayed return will be discounted at a higher rate than the present calculated cost of capital because of the increasing risk premiums present in the future periods' discount rates. The result of such an action would be an addition to the present value (price) of the common stock that would be smaller than the cash dividend given up for reinvestment. Gordon's position would require low dividend stocks to have a higher required rate of return than higher dividend level stocks, all else the same. It also implies that dividend level variability would be undesirable and stocks with higher variability would require a return premium.

Past Empirical Studies

There have been many studies testing for dividend effects on stock valuation and different studies have supported both the Miller and Modigliani irrelevance and the Gordon dividend preference positions.

Perhaps the best known early empirical work on the effects of dividends was done by Graham and Dodd. Their experience in working with investors and analysts led them to believe that dividends were relatively more important than earnings in determining a stock's price. In testing their hypothesis they found dividends were three times more important in determining stock price than were earnings. Later studies by Gordon (1959) and Durand (1959) produced results that supported the theory of a preference for dividends.

A later study by Friend and Puckett (1964) tried to reduce the confusion caused by conflict among different theoretical and empirical studies by pointing out problems with previous empirical studies and presenting new results. The problems they highlighted were: (1) the dividend variable proxying for the omitted firm risk variable; (2) the dividend may be used for information regarding long-run earnings because of greater fluctuation in short run earnings; (3) the retained earnings variable is measured less precisely, biasing the significance of retained earnings; (4) dividend payout may be affected by price, which is the opposite cause-and-effect relationship to the one being tested for, causing a higher than warranted significance of the effect of dividend on price. To reduce these problems Friend and Puckett made several adjustments; (1) a lagged payout ratio to allow for firm risk differences; (2) normalized earnings to remove short-

run earnings fluctuations; (3) a dividend supply equation to remove the reverse cause-and-effect relationship of the dependent variable, price, on the independent variable, dividend payout. Based on their results, they conclude that previous results of other studies supporting a positive effect of dividend on price are unwarranted.

Van Horne and McDonald (1971) used a different approach to testing the question of dividend relevancy. They compared firms that both paid dividends and issued new stock to firms that paid dividends but did not raise new equity. If the Miller and Modigliani dividend level irrelevancy argument was correct, no difference in value between the two groups of stocks would be found. Allowing for flotation costs, which Miller and Modigliani did not, would cause the equity issuing group to have a lower value, all else the same. Thus Van Horne and McDonald hypothesized that a result showing the equity issuing group to have the same or higher value than the non-issuing group would indicate a preference for dividends on the part of investors. Differences in risk were reduced by comparing firms in the same industries. The results showed both groups with insignificant differences in valuation or higher valuation for those firms with small equity financings. These results supported the dividend preference theory.

Two more recent studies which were the subject of the comparison tests in Chapter 3 used the Capital Asset

Pricing Model plus a dividend variable to test for dividend level relevancy and came to opposite conclusions. Black and Scholes (1974) used dividend yield as their dividend variable and found results supporting dividend irrelevancy. Bar-Yosef and Kolodny (1976) used payout ratio as their dividend variable and found a preference for dividends. Problems in the studies and results of the adjusted comparison tests will be discussed in connection with the other tests in Chapter 3 reported in the next section. Two very recent studies tested for a dividend effect on required rate of return of stocks using models very similar to the Black and Scholes model. Blume (1978) made only two adjustments: (1) dividend yield was based on price at the beginning of the period instead of end of period price as Black and Scholes had done; (2) quarterly returns were used as the dependent variables instead of monthly returns to better approximate dividend payment intervals. Litzenberger and Ramaswamy (1979) also used the Black and Scholes model but made changes in their methodology as follows: (1) securities were not grouped into portfolios to reduce measurement errors because to do so would mean a loss of information; (2) dividend yield was set to zero in months other than ex-dividend months; (3) the model coefficients were estimated cross-sectionally using Ordinary Least Squares, Generalized Least Squares, and Maximum Likelihood estimation techniques. Both Blume and Litzenberger and Ramaswamy found a positive

coefficient on the dividend yield variable, indicating an aversion for dividends. Litzenberger and Ramaswamy concluded, based on their Maximum Likelihood Estimator restuls, that there was a strong dividend aversion because of tax effects and that this effect existed in lesser degree even in non-ex-dividend months. Blume concluded that the positive coefficient was larger than could be expected from a tax effect and therefore that dividends may be proxying for a missing variable. In an unpublished paper that is essentially a criticism of the above two studies, Hess (1980) contends that the "Maximum Likelihood Estimator" used by Litzenberger and Ramaswamy is neither consistent nor maximum likelihood because of a violation of the normality assumption of variables used. Hess, based on his own tests, notes that the dividend effect is not uniform across securities and so is not consistent with a tax effect. His conclusion is that the dividend effect may be proxying for another unknown variable and, as a result, the relationship cannot be used to justify any particular dividend policies or portfolio selection strategies based on dividend yield.

There has been almost no explicit attention paid in the empirical literature to the hypothesis that dividend level variability itself may affect required rates of return even though it can be inferred from Gordon's position as well as the "clientele" and "information content" theories. All three seem to imply a stable

dividend or at least a stable dividend growth rate. The one empirical study that directly tests for effects of dividend variability was Mantripragada (1976). Two variability measures were tested: (1) the variance of dollar dividends per share, and (2) a "beta coefficient" estimated by regressing a firm's dividend per share against dividends per share of the Standard and Poor's Industrial Index. His results supporting the dividend "beta" as a relevant measure are suspect because of problems in his methodology. He did not adjust for differences in the scale of prices and dividends and thus may have a bias resulting from a correlation of the scales of prices, his dependent variable, and the independent dividend variability measures. He also did not include a firm risk variable and may therefore have the dividend variability measures proxying for the missing firm risk variable, which would not be the effect he was testing for. Chapter 4 of this dissertation addresses these problems and uses new tests to determine if there is a dividend variability effect on required rate of return.

Tests on Dividend Level Relevancy

One of the two principal concerns of this dissertation is the testing for a dividend level effect on the required rates of return on common stock. The tests for a dividend level effect can themselves be subdivided into two categories: (1) adjustment in the Black and Scholes and

the Bar-Yosef and Kolodny methodologies and retesting to reconcile their disparate results; (2) original tests for a dividend effect that may vary over time.

Black and Scholes and Bar-Yosef and Kolodny both use similar models in testing for a dividend effect. Black and Scholes use the following model:

$$E(R_i) = a_o + [E(R_m) - a_o]\beta_i + a_1(\delta_i - \delta_m)/\delta_m$$

where

$E(R_i)$ = the expected return on security i; the realized monthly return was used as a proxy for the expected return

a_o = intercept term; it is expected to be either R_F or the return on a zero beta portfolio

$E(R_m)$ = expected return on market; again, the realized monthly return was used as proxy

β_i = covariance between $\tilde{R}_i$ and $\tilde{R}_m$, divided by the variance of $\tilde{R}_m$

a_i = coefficient of the dividend variable

δ_i = dividend yield on security i

δ_m = dividend yield on the market

The first two terms of the equation are set up to allow for results consistent with the standard CAPM ($a_o = R_F$) or the zero beta form (a_o = return on zero beta portfolio). The third term is a measure of a stock's dividend yield relative to the market's average; a preference for dividends would be indicated by a negative coefficient on the third term.

Bar-Yosef and Kolodny (1976) employ the following model:

$$R_i = a_o + a_1\beta_i + a_2(D_i/E_i)$$

where

R_i = average geometric quarterly rate of return on security i over a specified test period

a_o = intercept term corresponding to a_o in the B&S equation

a_1 = coefficient on β corresponding to $[E(R_m) - a_o]$ in the B&S equation

β_i = beta coefficient for security i over the test period

a_2 = coefficient of the dividend variable

D_i/E_i = average dividend payout ratio (dividend divided by earnings) for security i over the test period

The first two terms perform the same basic function as in the Black and Scholes equation. The third term uses the dividend payout ratio as a measure of the amount of return received as dividends; a preference for dividends would be indicated by a negative coefficient on the third term.

Black and Scholes found no dividend effect while Bar-Yosef and Kolodny found a preference for dividends. The difference in results of the two studies is somewhat surprising given that the only difference in their models is the dividend variable; dividend yield versus payout ratio. However, the data bases, time periods, and methodology employed in the two studies varied substantially, which could explain their different conclusions.

Potential problems exist in each study which if dealt with might permit a reconciliation of their results.

The more serious problems are in the Bar-Yosef and Kolodny study: (1) no effort was made to reduce measurement errors in beta, which would cause a downward bias on the dividend level coefficient; (2) no effort was made to avoid a possible correlation of measurement errors in betas and returns which again could bias the results either up or down, depending on the unknown sign of the correlation. In Chapter 3, problems in both studies are adjusted for and the models are retested using a common methodology. Portfolios are formed to reduce the effect of measurement errors and the portfolio parameters are re-estimated to remove any selection bias. Cross-sectional regressions are run on each month's returns for 228 months. Sample size grew from 245 firms in 1958 to 508 in 1976. The regression coefficients are then pooled and "t" tests run to determine whether the average coefficients over time were significant. Based on a two-tailed test at the .05 level, none of the average coefficients on dividend yield or payout ratio were found to be significant in either the ove-all period or any of the subperiods (1958-63, 64-69, and 70-76). The results support the Black and Scholes conclusion of no systematic effect on returns that can be explained by a dividend effect. The results do not support the Bar-Yosef and Kolodny conclusion that there exists a preference for dividends that allows a lower yield on high dividend stocks than lower dividend stocks, all else the same. The

results do support the contention that the original Bar-Yosef and Kolodny results were due to biases resulting from their methodology.

While there have been many studies testing for a constant dividend effect, there have been no studies that have looked for a changing dividend effect. The effect could vary around zero over time and thus the average would not be significantly different from zero even though in fact there was a significant varying effect. The variance could be caused by some systematic pattern in dividends themselves, such as a payout pattern, or by some external factor. To test for a systematic changing effect, serial correlations were calculated between a given month's dividend coefficient and the coefficient 1 through 36 months later. The correlation coefficients, on both dividend yield and payout ratio, varied from positive to negative in no discernable pattern and had low (< 0.2) absolute values. The evidence does not support the hypothesis that there is a general significant or predictable cycling effect, independent of outside influences, of dividends on the required rate of return on stocks.

A varying effect could also be caused by some outside factor, such as changing investors' preferences for dividends (current income) versus capital gains (savings). Since investors' preferences are not directly measurable, two different proxies were used: (1) personal savings as a percent of disposable income; (2) the rate of change in

money supply measure M5 minus M1 (time and savings deposits at commercial banks and non-bank thrift institutions).

If an increased savings percentage proxies for an increased desire for savings among investors that will manifest itself as an increased preference for capital gains versus dividends, it will show as a positive coefficient in a regression of the savings measure against the dividend coefficient:

$$\gamma_{2,t} = \delta_0 + \delta_1 S_t$$

where

$\gamma_{2,t}$ = the coefficient on the dividend variable, from the previous cross-sectional regressions

S_t = personal savings as a percent of disposable income

Neither the constant nor the coefficient on the savings variable had "t" values that were significantly positive at the .05 level. It should be noted that the measure represents relative changes in personal savings but not in corporate or institutional preferences, if any. The differences in taxation and the facility of dealing in larger blocks with accompanying lower transaction costs, as well as possibly more active trading, may cause the latter two groups to value dividends differently from private investors. Thus the savings measure may not correctly proxy for the latter two groups.

It was posited that an abnormal growth rate in the proxy measure, $\Delta(M5 - M1)$, would indicate an investor preference for saving which would not only cause a larger than normal increase in the above savings devices but also result in a preference for capital gains over current dividend income. If the above scenario is true, it should exhibit itself through a positive coefficient on the money measure in the following model:

$$\gamma_{2,t} = \delta_0 + \delta_1 M51_t$$

where

$\gamma_{2,t}$ = the coefficient on the dividend variable, from the previous cross-sectional regression, t = 1,214

$M51_t$ = percent change in (M5 - M1) in period t = 1,214

To reduce the effects of serial correlation of the independent variable, the Cochran-Orcutt technique was used.

The results of this test are mixed. When run over the full time period for which information on M1 and M5 was available, 2/59 to 12/76, the results were not significant for either dividend yield or payout ratio. Yet when the large sample was broken down into three approximately equal subperiods, the first (3/59-12/6) period yielded a positive significant coefficient on the money measure when regressed against dividend yield, the second (2/65-12/70) a positive but not significant coefficient, and the third (2/71-12/76)

a negative significant coefficient! The same three subperiods, when run with payout ratio as the dependent variable, showed insignificant results for the independent variable's coefficient.

It may be that (M5 - M1) acts as a competitive use of investors' savings such that an abnormal use in the measure's rate of growth could be caused by a switch of funds out of common stock. If this is true, the sign of the coefficient, and its significance, will depend on whether the shift concerns common stock in general, with high and low dividend yields being immaterial, or whether the shift from institutional savings is to high or low dividend stocks.

Tests on Dividend Level Variability Relevancy

Chapter 4 tests for the effect of dividend policy variability on the required rate of return on common stock. It may be that the dividend effect is not due to dividend level but dividend variability. If investors have an aversion to return variability, then, given market imperfections, they may also have an aversion to variability in the forms of that return: dividends or capital gains. Tests were run to determine if there is a static dividend policy variability effect. Tests were also run to explore for the possibility that the effect of dividend policy instability changes over time or that the relative importance of dividends to investors, and thus dividend variability, changes.

The methodology used for the dividend variability tests is the same as was used for the dividend level tests in Chapter 3. The equation for the cross-sectional regressions was:

$$R_p + \gamma_0 + \gamma_1\beta_p + \gamma_2 L_p + \gamma_3 V_p + \varepsilon$$

where

R_p = return on portfolio p

β_p = beta for portfolio p

L_p = dividend yield for portfolio p

V_p = variability measure (dividend β) for portfolio p

The dividend variability measure used was the covariance of dividend yield with the market dividend yield divided by the market yield variance. This dividend "beta" was chosen for two reasons: (1) rational investors are expected to hold a portfolio of stocks for diversification and are thus not concerned with unsystematic variability in dividend yield, and (2) this measure will reduce effects of stock price variability on dividend yield because the measure is relative to the market movement.

Results of the tests for a static variability effect do not support the hypothesis that dividend yield variability affects the required return on a common stock. At the 0.05 level in a one-tailed test, none of the coefficient average "t" values for dividend variability were significant. Other measures such as variance, coefficient

of variation, and negative semivariance, were suggested and tested with substantially the same results.

Further tests were run to determine if the variability effect changed over time. The dividend variability coefficients were used as dependent variables in regressions run with savings as a percent of disposable income and the change in (M5 - M1); the same as was done for dividend level. If investors have a changing aversion for dividend variability, the coefficients in each of the above savings proxy regressions should be negative. The results of both tests supported the hypothesis that there is no preference for a stable dividend policy. The "t" tests on the coefficient averages were all insignificant at the 0.5 level.

Concluding Remarks

The results of the test performed in this dissertation do not support the hypothesis that dividend policy has a measurable effect on the return required on common stock, either through dividend level or dividend level variability. Individual investors may have preferred policies based on their own tax situation or other factors but no systematic aggregate preference was indicated by the tests' results. Caution must be used in interpreting the results any further. The generally insignificant statistics do support the dividend irrelevancy position but could also result from other problems confusing the tests for the effect. Some of these problems are discussed below.

1. Ex post returns are used as estimates of the unobservable ex ante returns required for testing. There have been comments that a significant portion of the period tested was atypical and, as such, could affect test results. To resolve this, data must be made available for longer periods so that such atypical period effects can be minimized.

2. Roll (1977) has stated that, for any sample of assets, any mean-variance efficient portfolio used to proxy the true "market portfolio" will give betas that will satisfy the linearity relation exactly whether or not the true market protfolio is mean-variance efficient. It is not currently feasible to include all individual assets in the sample or know the true market portfolio. As a result, caution must be used in interpreting test results while progress must be made in identifying the market's true composition.

3. If there is a dividend effect based on preferences that varies systematically over time, a measure based on the reason for that variance may be essential to measuring that effect. The savings and money measures used did not yield positive results. Better measures that can be more clearly linked to the possible variations are needed to settle the question.

4. The tests for a dividend policy variability aversion effect on security required rates of return did not yield significant results. As noted earlier, most

firms believe that dividend policy variability is undesirable and so strive to minimize it. The portfolios formed to reduce measurement errors would also reduce the level of variability and its effect on return for those firms who have not minimized it by averaging the relevant data with the majority of firms who do minimize it. This, in combination with the fact that all level measures are subject to variations that are not directly connected with dividend policy (e.g., price variability in dividend yield and earnings variability in payout ratio), may well lead to insignificant test results for a true effect. Using a dividend level beta helped reduce the problem but a better measure or new techniques for reducing the "noise" present may yield better results.

This study has extended the analysis of the dividend policy irrelevancy question. The results still do not indicate a dividend policy effect based on a preference for different dividend levels or policy variability. However, problems still remain in testing and variable measurement that must be overcome before the issues addressed here are finally resolved.

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BIOGRAPHICAL SKETCH

Paul A. Vanderheiden was born on October 25, 1945, and was raised in the Neenah, Wisconsin, area. He graduated from the University of Notre Dame in 1967 with a bachelor's degree in political science. He received a Master of Business Administration degree from the University of Wisconsin-Oshkosh in 1974 and then entered the University of Florida to study for a Ph.D. in finance. Paul is currently employed as an Instructor at the University of Wisconsin-Milwaukee.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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